



DEPARTMENT OF THE AIR FORCE
59TH MEDICAL WING (AETC)
JOINT BASE SAN ANTONIO - LACKLAND TEXAS



7 APR 2017

MEMORANDUM FOR SGTT

ATTN: CAPT ANDREW PATTERSON

FROM: 59 MDW/SGVU

SUBJECT: Professional Presentation Approval

1. Your paper, entitled **Dynamics of the Dermatologic Microbiome in U.S. Air Force Basic Training** presented at/published to **2017 Department of Defense Microbiome Symposium, Colorado Springs, CO, 5-7 April 2017** in accordance with MDWI 41-108, has been approved and assigned local file #**17161**.
2. Pertinent biographic information (name of author(s), title, etc.) has been entered into our computer file. Please advise us (by phone or mail) that your presentation was given. At that time, we will need the date (month, day and year) along with the location of your presentation. It is important to update this information so that we can provide quality support for you, your department, and the Medical Center commander. This information is used to document the scholarly activities of our professional staff and students, which is an essential component of Wilford Hall Ambulatory Surgical Center (WHASC) internship and residency programs.
3. Please know that if you are a Graduate Health Sciences Education student and your department has told you they cannot fund your publication, the 59th Clinical Research Division may pay for your basic journal publishing charges (to include costs for tables and black and white photos). We cannot pay for reprints. If you are a 59 MDW staff member, we can forward your request for funds to the designated Wing POC at the Chief Scientist's Office, Ms. Alice Houy, office phone: 210-292-8029; email address: alice.houy.civ@mail.mil.
4. Congratulations, and thank you for your efforts and time. Your contributions are vital to the medical mission. We look forward to assisting you in your future publication/presentation efforts.

Linda Steel-Goodwin

LINDA STEEL-GOODWIN, Col, USAF, BSC
Director, Clinical Investigations & Research Support

PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS

INSTRUCTIONS

USE ONLY THE MOST CURRENT 59 MDW FORM 3039 LOCATED ON AF E-PUBLISHING

1. The author must complete page two of this form:
 - a. In Section 2, add the funding source for your study [e.g., 59 MDW CRD Graduate Health Sciences Education (GHSE) (SG5 O&M); SG5 R&D; Tri-Service Nursing Research Program (TSNRP); Defense Medical Research & Development Program (DMRDP); NIH; Congressionally Directed Medical Research Program (CDMRP) ; Grants; etc.]
 - b. In Section 2, there may be funding available for journal costs, if your department is not paying for figures, tables or photographs for your publication. Please state "YES" or "NO" in Section 2 of the form, if you need publication funding support.
2. Print your name, rank/grade, sign and date the form in the author's signature block or use an electronic signature.
3. Attach a copy of the 59 MDW IRB or IACUC approval letter for the research related study. If this is a technical publication/presentation, state the type (e.g. case report, QA/QI study, program evaluation study, informational report/briefing, etc.) in the "Protocol Title" box.
4. Attach a copy of your abstract, paper, poster and other supporting documentation.
5. Save and forward, via email, the processing form and all supporting documentation to your unit commander, program director or immediate supervisor for review/approval.
6. On page 2, have either your unit commander, program director or immediate supervisor:
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7. Submit your completed form and all supporting documentation to the CRD for processing (59crdpubspres@us.af.mil). **This should be accomplished no later than 30 days before final clearance is required to publish/present your materials.** If you have any questions or concerns, please contact the 59 CRD/Publications and Presentations Section at 292-7141 for assistance.
8. The 59 CRD/Publications and Presentations Section will route the request form to clinical investigations, 502 ISG/JAC (Ethics Review) and Public Affairs (59 MDW/PA) for review and then forward you a final letter of approval or disapproval.
9. Once your manuscript, poster or presentation has been approved for a one-time public release, you may proceed with your publication or presentation submission activities, as stated on this form. **Note:** For each new release of medical research or technical information as a publication/presentation, a new 59 MDW Form 3039 must be submitted for review and approval.
10. If your manuscript is accepted for scientific publication, please contact the 59 CRD/Publications and Presentations Section at 292-7141. This information is reported to the 59 MDW/CC. All medical research or technical information publications/presentations must be reported to the Defense Technical Information Center (DITC). See 59 MDWI 41-108, *Presentation and Publication of Medical and Technical Papers*, for additional information.
11. The Joint Ethics Regulation (JER) DoD 5500.07-R, *Standards of Conduct*, provides standards of ethical conduct for all DoD personnel and their interactions with other non-DoD entities, organizations, societies, conferences, etc. Part of the Form 3039 review and approval process includes a legal ethics review to address any potential conflicts related to DoD personnel participating in non-DoD sponsored conferences, professional meetings, publication/presentation disclosures to domestic and foreign audiences, DoD personnel accepting non-DoD contributions, awards, honoraria, gifts, etc. The specific circumstances for your presentation will determine whether a legal review is necessary. **If you (as the author) or your supervisor check "NO" in block 17 of the Form 3039, your research or technical documents will not be forwarded to the 502 ISG/JAC legal office for an ethics review.** To assist you in making this decision about whether to request a legal review, the following examples are provided as a guideline:

For presentations before professional societies and like organizations, the 59 MDW Public Affairs Office (PAO) will provide the needed review to ensure proper disclaimers are included and the subject matter of the presentation does not create any cause for DoD concern.

If the sponsor of a conference or meeting is a DoD entity, an ethics review of your presentation is not required, since the DoD entity is responsible to obtain all approvals for the event.

If the sponsor of a conference or meeting is a non-DoD commercial entity or an entity seeking to do business with the government, then your presentation should have an ethics review.

If your travel is being paid for (in whole or in part) by a non-Federal entity (someone other than the government), a legal ethics review is needed. These requests for legal review should come through the 59 MDW Gifts and Grants Office to 502 ISG/JAC.

If you are receiving an honorarium or payment for speaking, a legal ethics review is required.

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NOTE: All abstracts, papers, posters, etc., should contain the following disclaimer statement:

"The views expressed are those of the [author(s)] [presenter(s)] and do not reflect the official views or policy of the Department of Defense or its Components"

NOTE: All abstracts, papers, posters, etc., should contain the following disclaimer statement for research involving humans:

"The voluntary, fully informed consent of the subjects used in this research was obtained as required by 32 CFR 219 and DODI 3216.02_AFI 40-402."

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"The experiments reported herein were conducted according to the principles set forth in the National Institute of Health Publication No. 80-23, Guide for the Care and Use of Laboratory Animals and the Animal Welfare Act of 1966, as amended."

PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS			
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5. PROTOCOL TITLE: (NOTE: For each new release of medical research or technical information as a publication/presentation, a new 59 MDW Form 3039 must be submitted for review and approval.) Dynamics of the dermatologic microbiome in military members			
6. TITLE OF MATERIAL TO BE PUBLISHED OR PRESENTED: Dynamics of the dermatologic microbiome in U.S. Air Force Basic Training			
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d. Noe, Jody, C	Civ	59 MDW Clinical Research Div/SGVUL	
e. Lenz, Brittany, L	Capt/O-3	59 MDW Dept of Dermatology	
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21. APPROVING AUTHORITY'S PRINTED NAME, RANK, TITLE Maria J. Belmonte, Lt Col, O-5, Flight Commander, Trainee Health	22. APPROVING AUTHORITY'S SIGNATURE <i>ma Belmonte</i>		23. DATE 28 Mar 2017

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DYNAMICS OF THE DERMATOLOGIC MICROBIOME IN U.S. AIR FORCE BASIC TRAINING

Andrew Patterson, MD¹; Thomas Beachkofsky, MD²; Bryant Webber, MD, MPH¹; Brittany Lenz, MD²; Patrick Brown, MD²; Jody Noe, PhD²; Michael Grinkemeyer, MD⁴; James Baldwin, PhD⁴; Heather Yun, MD⁵

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⁴711th USAFSAM/FHT Applied Technology & Genomics, Wright Patterson Air Force Base, Ohio; ⁵Department of Infectious Disease, 59th Medical Wing, Joint Base San Antonio-Lackland, Texas



BACKGROUND

Cutting-edge metagenomic sequencing technology is an increasingly available and cost-effective avenue for population-based clinical studies. The skin flora represents a relatively unexplored niche of microbiome research despite its many unexplored linkages to host health and disease. The dermatologic microbiome possesses wide-ranging potential clinical and operational military applications including:

- Pre- and post-deployment screening
- Occupational hazard identification
- Global health biosurveillance
- Personalized medicine and biomarker detection
- Identifying at-risk patients for infections in the subclinical stage
- Guiding regional antibiograms including emerging antibiotic resistant organisms
- Future inquiry into systemic and topical interventions to reestablish cutaneous microbiota homeostasis after antibiotic use

As a leading cause of morbidity among U.S. service members and trainees in both combat and standard occupational locales, skin and soft tissue infections (SSTIs) have a major impact on current and future operational readiness.¹ Basic military trainees face unique environmental influences during their highly-regimented 8 week training course including working within a flight of approximately 50 individuals for nearly 24 hours a day and receiving universal chemoprophylaxis against Group A beta-hemolytic streptococcus through year-round provision of bicillin LA 1.2M intramuscular units during in-processing.

U.S. Air Force Basic Military Training

- Approximately 39,000 U.S. Air Force Basic Military Trainees complete their initial enlisted training at Joint Base San Antonio-Lackland, Texas, each year
- The documented SSTI rate for all basic military trainees from 2012 to 2014 was 0.82%²
- This results in an estimated 390 SSTIs annually with a combined financial burden to the U.S. Air Force of \$446,940 encompassing purely antibiotic costs and missed training days (not including healthcare facility staffing and operational costs)

Taxon	Scientific Name	Hits	Average Score	Samples
1437442	Bacillus anthracis str. 95014	30	62.00	2
526980	Bacillus cereus ATCC 10876	14	70.00	4
292	Burkholderia cepacia	32	129.00	2
1328859	Escherichia coli O157:H7 str. SS17	23	209.50	2
1268238	Escherichia coli O5:K4(L):H4 str. ATCC 23502	74	168.75	4
1095674	Neisseria meningitidis 61103	19	96.33	3
686659	Propionibacterium acnes SK187	3862	132.50	4
1400868	Pseudomonas aeruginosa VRFP04	163	123.00	4
1402785	Staphylococcus aureus M1300	1	138.00	1
1429044	Vibrio parahaemolyticus UCM-V493	5	38.33	3
404218	Yersinia pestis biovar Antiqua str. UG05-0454	4	46.00	1

FIGURE 1 – SELECTED MICROORGANISM YIELDS FROM TRIAL AGNOSTIC SEQUENCING PERFORMED ON 4 HEALTHY VOLUNTEER PALMAR SWABS

METHODS

Investigators from the 59th Medical Wing and the 711th Human Performance Wing partnered to design a joint site feasibility study utilizing emerging genomic sequencing technologies to assess changes in microbial colonization of the skin in the basic military trainee population in response to communal living and universal Group A Strep chemoprophylaxis.

Planning and Approval Steps

- Received permission from the 737th Training Group commander to utilize 10 flights of new basic military trainee flights, 5 male and 5 female, encompassing an estimated 500 participating subjects and capitalizing on the extant process of randomized allocation of new trainees
- Obtained approval from the 59th Medical Wing Institutional Review Board (FWH 20170033H) to begin anticipated subject enrollment beginning summer 2017 with an anticipated end date of fall 2017
- Small scale validation trials of hand microbiota from 4 deidentified volunteers are in progress to optimize collection, transport, analysis, and interpretation models for each of the parallel bacterial and agnostic sequencing arms. A sample of initial preliminary agnostic data is shown in Figure 1.

DESIGN & RESULTS

- Subjects will have sterile saline pre-moistened cutaneous swabs taken from the bilateral forearms and forehead at 3 time points – Week 0, Week 4, and Week 7 of their training curriculum
- Subjects will be excluded from the study for reported penicillin allergy
- Skin swabs will be pooled and analyzed across two parallel study arms:
 - 16S ribosomal RNA sequencing utilizing the Ion PGM Reporter Sequencer to identify purely bacterial components
 - Agnostic sequencing utilizing the Ion Proton Next-Generation Sequencer to identify bacterial, viral, and fungal elements

Quantified metagenomic analysis of the epidemiologic changes in the collective dermatologic microbiome are being compared based on shifts in microbiota flora frequencies according to:

- Gender
- Dorm and occupational exposures
- Temporal relation to penicillin administration
- Known pathogenic and non-pathogenic microorganisms

GOALS

- Further establish a framework for skin microbiome data collection, analysis, and interpretation in Department of Defense laboratories as a non-invasive screening tool
- Define an epidemiologic baseline for the effects of systemic antibiotic administration on the cutaneous microbiota
- Demonstrate the skin flora shifts that occur as a result of communal living in the BMT population
- Identify dominant and potentially high risk microorganism signatures that may predispose trainees to skin and soft tissue infections

Our deepest thanks to Dr. Laura Munro, Col William Fischer, and all BMT leadership, to Lt Col Ruth Brenner and the AFMSA team, to Kimberly Murphy, research assistant, and to John Yevick, Dion Holmes, and the 59th Medical Wing Science & Technology office. The views expressed are those of the authors and do not reflect the official views or policy of the Department of Defense or its Components. References: (1) Johnson RC, Ellis MW, Lanier JB, Schlett CD, Cui T, Merrell DS. Correlation between Nasal Microbiome Composition and Remote Purulent Skin and Soft Tissue Infections. Infect Immun 2015; 83: 802-811. (2) Fisher A, Webber BJ, Pawlak MT, Johnston L, Tchandia JB, Yun H. Epidemiology, Microbiology and Antibiotic Susceptibility Patterns of Skin and Soft Tissue Infections, Joint Base San Antonio-Lackland, Texas, 2012-2014. MSMR 2015; 22(7): 1-6.